Description

Method and electronic device used to synthesise the sound of church organ flue pipes, by taking advantage of the physical modeling technique of acoustic instruments.

The present patent application refers to a method and electronic device used to synthesise the sound of church organ flue pipes, by taking advantage of the physical modeling technique of acoustic instruments.

Numerous numerical algorithms of physical-mathematical models have been developed based on the examination of the physical behaviour of organ flue pipes and the sound they produce, in order to synthesise the sound emission of aerophone instruments in real time. Some of these models are based on the mutual symbiotic interaction between a non-linear active section, generally defined as "excitation", and a linear passive section, generally defined as "resonator". An example can be found within the method described in US patent 5,521,328. The relative numerical algorithm extemporarily produces a sequence that represents the sound of the instrument analysed and translated into a physical model. The sound is characterised by an initial time interval, defined as "attack transient", during which intensity increases up to a certain value. The intensity value is indefinitely maintained over time during the second phase, defined as "sustain phase", during which the waveform is approximately periodic. The analytical characteristics of this waveform, of which the most important is fundamental frequency, depend on each of the parameters that regulate the operation of the numerical simulation.

Being the simulation performed in the time domain instead of the frequency domain because of the presence of numerous non-linear functional blocks, the relation between the set of parameters and each spectral characteristic of the generated sequence is extremely difficult to establish a priori.

The characteristics can be altered by changing the set of parameters,